Long-Term Resource Planning

At the Bonneville Power Administration

July 14, 2020

Bonneville Power Administration

- Bonneville is a federal Power Marketing Administration (PMA)
  - Markets the power from 31 federal hydroelectric projects, one nonfederal nuclear plant, and several small nonfederal power plants
  - Operates and maintains more than 15,000 miles of transmission lines
  - Bonneville's territory includes Idaho, Oregon, Washington, western Montana, and small parts of eastern Montana, California, Nevada, Utah, and Wyoming
- Bonneville Power Services provides a variety of energy, capacity, load shaping and load following products
  - Bonneville serves 137 customers, ranging in size from Snohomish County PUD #1 to City of Minidoka, where Snohomish is ≈675,000% the size of Minidoka
    - 121 of these are Load Following

Bonneville Resource Program

The Resource Program:

- Begins with a forecast of Bonneville load obligations and existing resources and then determines needs
- Identifies and evaluates potential solutions to meeting those needs
  - Energy efficiency, demand response, market purchases, wind, solar, gas plants, etc.
- Identifies least-cost method of meeting future needs

The Resource Program is not:

- A decision or policy document such as an Administrator's Record of Decision
- A requirement of law or a regulating body such as FERC or NERC

Resource Program Process

- Bonneville's Resource Program involves coordinating many individual planning processes
- Different work groups produce necessary components, either as part of their normal routine, or by special request
- From start to finish, the process takes around 18 months.

Supporting Processes

- Weather and Streamflow
  - Bonneville currently considers an 80-water year historical record (1929-2008)
  - Forecasts weather in terms of Heating and Cooling Degree Days over the time period of analysis to inform load shapes
  - Does not currently include any explicit accounting for climate change
- Load forecast
  - Individual load forecast for each customer, going out 20 years
  - Completed by Bonneville and in consultation with the customer utility
  - Working toward having a “frozen-efficiency” forecast for each utility

Supporting Processes

- Existing Resource Forecast
  - Historical streamflow levels from the 80-water years are given to Bonneville's current set of hydro resources to assess a potential range of energy output
  - Accounts for expected outages for maintenance or overhauls

Supporting Processes

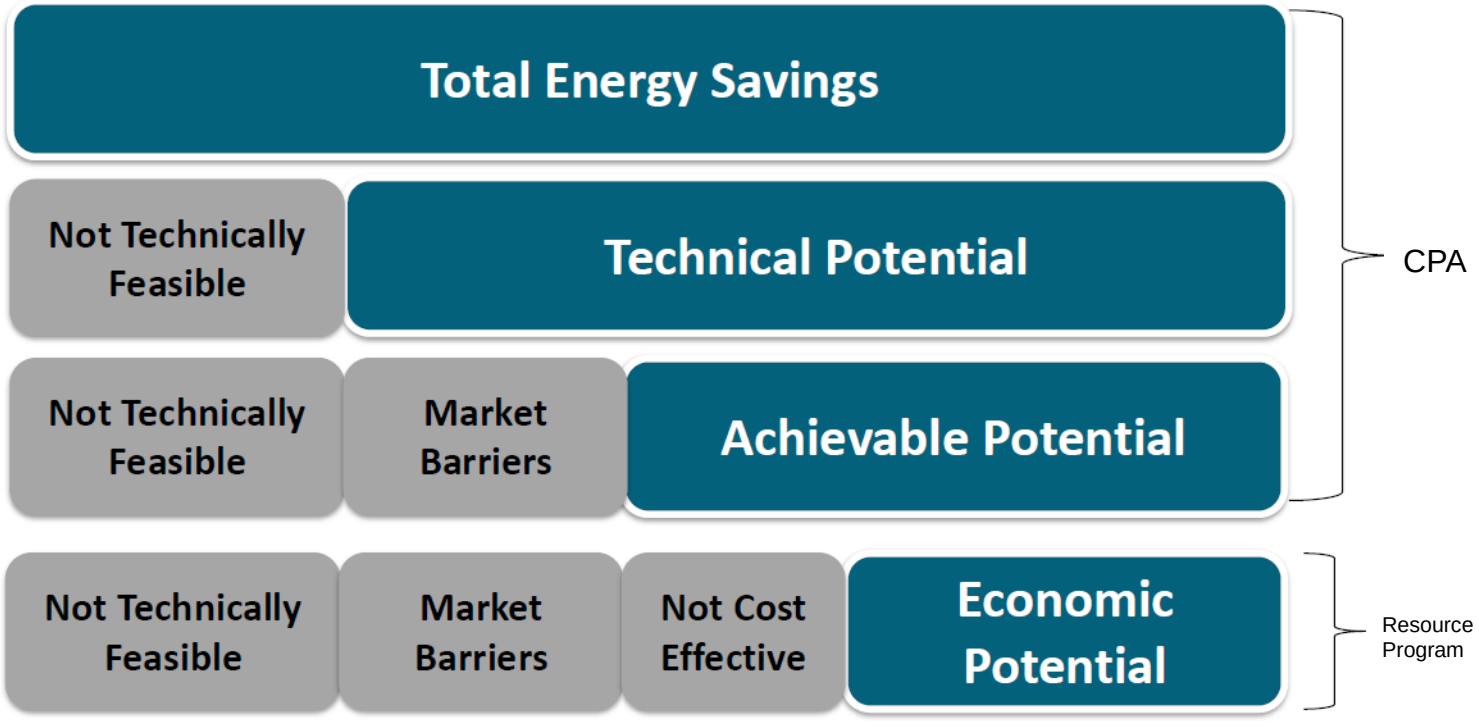
- Needs Assessment
  - The Needs Assessment compares Bonneville's expected loads to its expected resources, in a stochastic manner, to determine whether more resources are needed
  - Bonneville measures whether it needs new resources by looking at five metrics, measuring energy and capacity
    - If Bonneville does not have enough resources to satisfy a metric, then the Needs Assessment identifies a "need"
  - Any identified "needs" are passed to the Resource Program optimization process as a problem to solve for

Resource Options

- Generating resources supply curves
  - To date have included natural gas, solar, and wind.
- Energy efficiency and demand response
  - Beginning in 2017, Bonneville developed its own Conservation (CPA) and Demand Response potential assessments (DRPA)
  - CPA - based off of the Northwest Power and Conservation Council's Power Plan – using same set of technologies and adjusting potential based on the characteristics and loads of public power
  - DRPA – developed by a third party consultant in 2018. The next DRPA will be responsive to the 2021 Power Plan and prepare new planning inputs for the 2022 BPA Resource Program

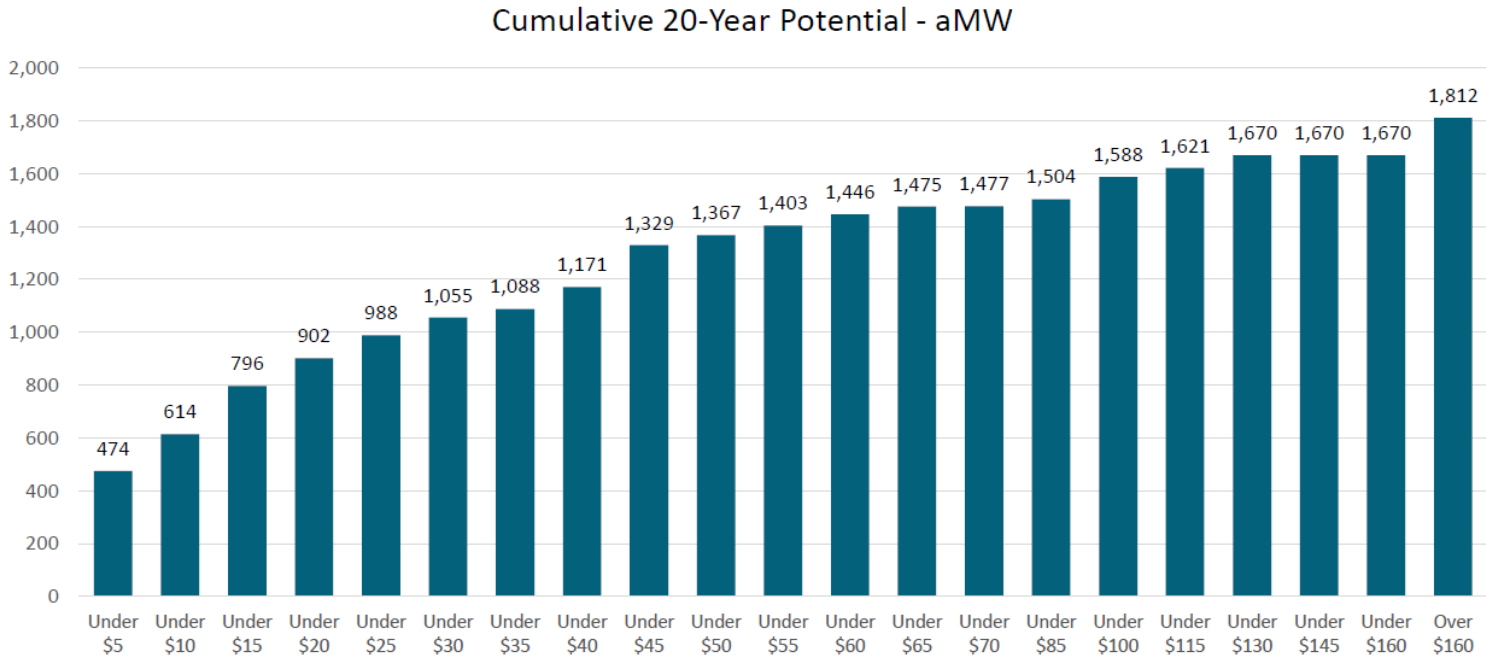
BPA Conservation Potential Assessment

- CPA identified technically achievable EE potential over 20 year period
- Resource Program compared amount and costs of EE to other resources
- Amount chosen identified as the cost effective potential



Energy Efficiency Supply Curve

- EE provided to Resource Program model through ‘bundles’ of savings
  - 6 End uses
  - 12 levelized cost bins
  - Year
  - Lost opportunity and retrofit

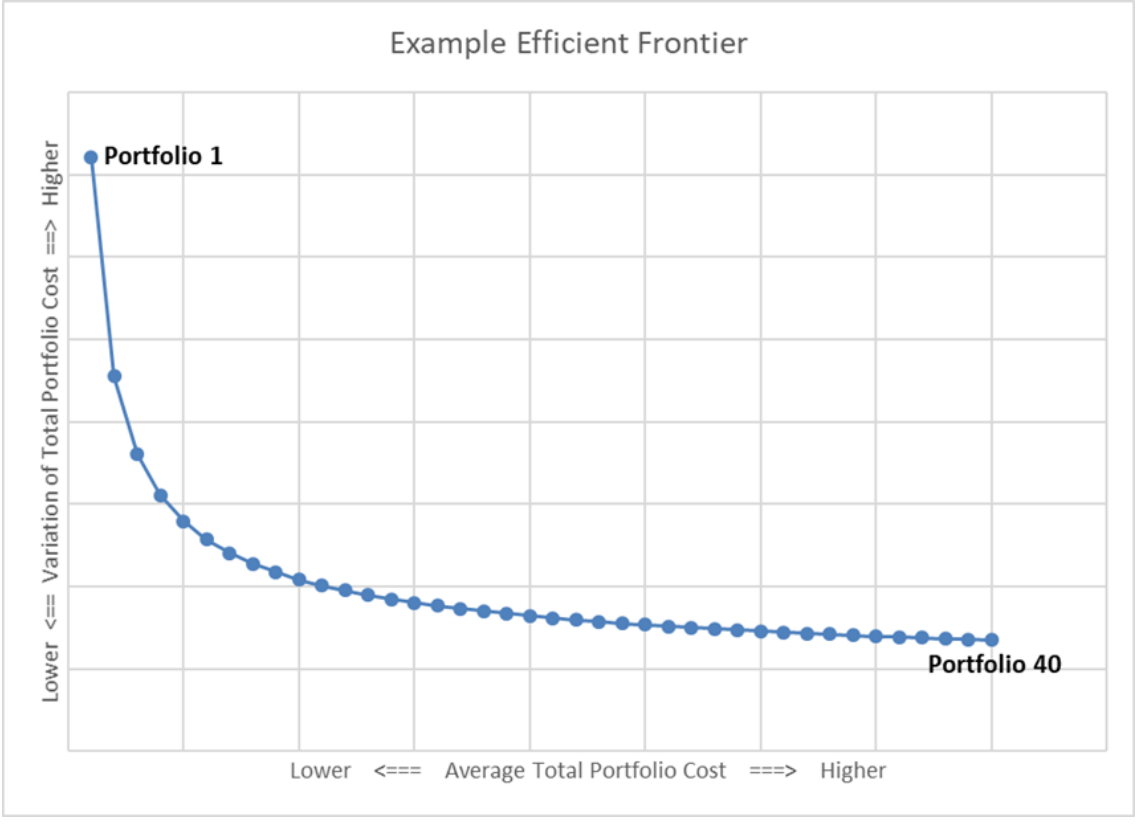


Portfolio Optimization

- The optimization process takes as input
  - “Needs” from the Needs Assessment
  - A forecast of energy market prices
  - A forecast of energy market depth
  - A forecast of resource costs and expected output
    - Solar, wind, natural gas, energy efficiency, demand response, market purchases

Solving for Bonneville's Needs

- The optimization then solves for Bonneville's "needs" by creating a portfolio of some subset of the available resources
  - Importantly, one of the provided solutions is the "least-cost", which consists of the portfolio of resources that meets the "needs" at the lowest cost of all possible combinations
  - Additionally, the optimization provides a portfolio that experiences the lowest variation in cost
  - The optimization then creates portfolios in between the two points resulting in an efficient frontier



Resource Program and Energy Efficiency

- The Resource Program is one input considered when determining BPA's energy efficiency goals
- In 2018, the results of the Resource Program confirmed that BPA's current 7th Plan savings goal was in line with the needs identified
- Also provided BPA with direction on the *type* of energy efficiency that provides the most value to BPA
  - Value through reducing highest peak winter energy needs
  - Specifically HVAC and weatherization measures
- Based on these results, BPA began a strategic shift in focusing programs and incentives on these high value measures

BPA EE Policy

- Post 2011 Policy
  - Established the policy framework for energy efficiency between BPA and customers
- Defines:
  - Acquisition of EE funds (collected in Tier 1 rates)
  - Funding mechanism (Energy Efficiency Incentive)
  - Utility self-funding share
  - Performance payments
  - Small/Rural/Residential (SRR) Utilities

EE Implementation

1. BPA sets EE goals at the all-public-power level
2. BPA determines the budget needed to achieve the savings goal
   - Assumes 30% of goal will be self-funded (in total) by utilities
   - Remaining budget needs are collected through rates and then distributed back to utilities through the Energy Efficiency Incentive (EEI)
3. The EEI is allocated to each utility by the Tier One Cost Allocation (TOCA) share
4. Utilities can choose to
   - acquire conservation and invoice BPA for up to their full budget allocation
   - Give their budget to another utility
   - Not acquire conservation and not invoice BPA

Utility Expectations

- Utilities are not assigned individual targets
- Utilities are not assigned individual self funding targets, but expected in total across all utilities to achieve 30% of savings through self-funding
- Utilities are encouraged to spend all of their EEI, but are not required
- If a utility does not want to participate in EE program, they can:
  - give funding to another utility through a bi-lateral transfer
  - Inform BPA, who offers funding to all utilities through the ‘unassigned account’ mechanism

BPA EE Program Support

- Portion of funding available for performance payments which are tied to savings acquisition

	Payment Cap	Payment Rate
SRR	30% of EEI	$0.08/kWh
Non-SRR	20% of EEI	$0.04/kWh

- Program Support
  - Residential retail programs
  - Energy Smart Industrial
  - Commercial Trade Alley Network
  - Coming Soon: Residential ‘Comfort Ready Homes’
  - Marketing toolkit and portal
  - BPA Energy Efficiency Representatives

Additional Regional Infrastructure

- With the collection of funds through Tier 1 rates, BPA also supports regional infrastructure including
  - Direct funders of NEEA
  - Engineering support and technical review of custom projects
  - Program evaluation
  - Funders and participants of the Regional Technical Forum
  - Regional pilot projects and field studies